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Breast X-rays: Files Yield a Disturbing Tale

A great deal of public attention has been given to the recent decision to terminate routine breast x-rays for women under 50 who are enrolled in a nationwide cancer screening program jointly sponsored by the National Cancer Institute and the American Cancer Society.

However, little attention has been given to the genesis of the program. Since it was terminated for fears that the x-rays might do more harm than good, SGR became curious as to why nearly four years of x-ray screening took place before the NCI-ACS axis responded to well-established doubts about the safety of the method. In the meantime, some 270,000 women, ages 35 and over, have had at least one mammogram in the planned 5-year

House Science Committee

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program, and a substantial number have had as many as three.

To look into the matter, SGR invoked the Freedom of Information Act to obtain a collection of background papers, memoranda, and correspondence that NCI Director Frank J. Rauscher Jr. ordered assembled as a "briefing book" for his own use in July, when the decision to terminate under-age-50 mammograms was about to be made. In response to Rauscher's request, NCI officials rummaged their files and produced over 300 pages of material, including a great many internal documents and confidential communications that, but for the Information Act, would never have been released.

The record is obviously not a complete one, and it must be recognized that the available items relate to an issue on which competent people of good judgment can honestly differ. The risk-benefit arithmetic of x-ray mammography is complex and close.

Nevertheless, the record, fragmentary as it is, strongly suggests that the decision to x-ray 270,000 women was rammed through NCI, over the doubts of its own staff specialists, by the American Cancer Society. The program went full speed ahead, despite warnings of slipshod design and health hazards. And when doubts were expressed by independent health statisticians, NCI bucked them to ACS, which responded with abuse.

The ACS performance is easily understood. ACS believes in spreading the alarm about cancer and likes big

programs that draw in the multitudes. However, NCI's role as a doormat for the Cancer Society's ambitions — in disregard of some of NCI's own professional judgments — is difficult to understand. SGR suggests that Congress might usefully look into the matter.

We note, too, without comment, that NCI collaboration with the Cancer Society took place under Director Frank J. Rauscher Jr., who last month announced that he is leaving NCI to take a \$75,000-a-year post with ACS.

At the outset it should be noted that the mass screening program was conceived by ACS, in 1972, within months after the passage of the National Cancer Act of 1971. The Act, product of a Nixon-Kennedy competition to grab the title of champion of a War on Cancer, promised a gusher of funds for a broad range of cancer-related activities. Among them was "cancer control," an ACS favorite which had previously taken second place to NCI's preference for cancer research. The ACS

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In Brief

Frank J. Rauscher Jr., director of the National Cancer Institute, said last February that he would quit the \$37,800-a-year post unless he got a pay raise to help pay the school costs of his five children. Congressional efforts for a boost to \$52,000 failed last month, and Rauscher now plans to leave. He's been appointed senior vice president for research of the American Cancer Society, at \$75,000 per year.

Dixy Lee Ray, former chairperson of the Atomic Energy Commission and, for a brief time, top science official of the State Department, has won the Democratic nomination for governor in the State of Washington.

After saying no for a long time, the Food and Drug Administration is considering a requirement for baby food manufacturers to identify by percentages the major ingredients in their products. The FDA action is in response to a petition from the Washington-based Center for Science in the Public Interest.

The Nuclear Regulatory Commission has concluded that there is no need to create a Federal Security Agency to protect commercial nuclear facilities and materials. In a report to Congress, NRC says that nuclear contractors can handle the job with their own security forces.

...X-ray Program Went on Despite Major Doubts

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board quickly endorsed a mass-screening project and passed the proposal to NCI. Offered as a major rationale for the program were controlled trials conducted in the previous decade by New York's Health Insurance Plan (HIP). These showed that routine mammography was useful for detecting breast cancer in asymptomatic women over 50, an age at which the incidence goes up. The HIP trials, however, showed no advantage for using the technique on younger women, but at ACS' urgings, NCI agreed to start the program with age 35, apparently in the hope of finding an advantage.

In any case, the decision to collaborate with ACS evoked doubts within NCI almost at the outset. On March 1, 1973, John C. Bailar III, a statistician who was then NCI's deputy associate director for cancer control, wrote an internal memo in which he stated:

I have recently become aware of a number of serious questions and criticisms about the Breast Cancer Detection Program. Some of these have come from various site visit teams, especially those with some background in population studies, statistics, or data management. . . . Their opinion, roughly summarized, is that no satisfactory workscope can be written until a number of basic questions are answered in some detail. . . . I have reluctantly come to the conclusion that the program would benefit from critical and independent judgment by a single competent epidemiologist who would draw on other support as needed.

Bailar followed this with a detailed list of questions, among them, "Is there reason for concern over the effects of repeated radiation exposure?" But his main concern at that point — when the screening was just getting underway — was that it was a vast, catchall program with no statistical design or controls built in.

Bailar's answer came March 30, 1973, in a memo from Kenneth B. Olson, chief of the diagnosis branch in NCI's Division of Cancer Biology and Diagnosis. Olson wrote:

This project has limited objectives and they have been pretty much dictated by the American Cancer Society. In summary they are:

Can American Cancer Society volunteers mobilize a large number (100,000 per year) of volunteers for thermography, mammography, and a physical exam?

This rather ends the objectives and this means that the only statistically sound method of prolonging a disease free interval for cancer (i.e. the HIP study) will be applied to a large population.

This in itself would be an interesting goal to achieve.

Why try to write research or controls into this ongoing program?

The stampede was on, and doubters were not encouraged. A sense of the atmosphere then prevailing can be deduced from comments made a few months earlier by Nathaniel I. Berlin, director of the Division of

Cancer Biology and Diagnosis, who told a meeting (according to an NCI summary): "... both the ACS and the NCI will gain a great deal of favorable publicity because they are bringing 'research findings to the public and applying them.' This will assist in obtaining more research funds for basic and clinical research which is sorely needed."

Within the inner councils, there was no absence of concern about radiation hazards and the wisdom of exposing women under 50 when there was no evidence that it might benefit them and there was evidence that it might harm them, but the momentum of the project simply rolled over the doubts. Thus, a memo reporting on a meeting held in early 1973 noted that Alan S. Rabson, of the Division of Cancer Biology and Diagnosis, "raised the point that mammography was the real risk within this study." The memo continues:

Though again there was no expert sitting within the Clinical Research Committee on the quantity of ionizing radiation delivered to a cancer-prone human tissue exposed to this known carcinogenic agent, it was the request of the CRC that a statement be included in the protocol that some of the world's experts had looked at the technique to be followed and recommended that this delivery of ionizing radiation to the population would not constitute a significant hazard.

A summary of another meeting, also in early 1973, reports that Philip Strax, of the Guttman Institute, New York, "commented on screening and said that mammography was of virtually no value in women under 50 years of age."

The criticisms continued to mount, though few, if any, of them ever came to public attention. On July 16, 1973, for example, Marvin Zelen, professor of statistics at the State University of New York, Buffalo, wrote to NCI Director Rauscher that "The project is ill-conceived and is not likely to result in significant patient benefit."

NCI forwarded this and other criticisms to ACS for comment, which came in a letter, dated October 3, 1973, from Arthur I. Holleb, ACS senior vice president for medical affairs and research. Marked "Confidential," Holleb's reply stated:

I do not feel qualified to answer with statistical expertise. . . I suspect that the critic has had little or no experience with the clinical diagnosis and management of breast cancer. Will there never be an end to the 'biological determinists' and 'therapeutic nihilists' who minimize the importance of early diagnosis and prompt treatment, yet rush their wives to the physician's office at the first suspicion of possible cancer?

In reference to a misspelling in one of the critical communications, Holleb added, "Lastly, I am always suspect of the man who comments on a breast cancer

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Congressional Group Sets up "Clearinghouse on the Future"

Capitol Hill is dotted with small consortia of Senators and Representatives who feel kinship on issues that are not easily accommodated by the existing committee structure. So they huddle for mutual support and exchange of information. One of the latest to appear is the 11-member Congressional Clearinghouse on the Future, organized last April by Rep. Charles Rose, a second-term Democrat from North Carolina, with assistance from Alvin Tofler, author of "Future Shock."

As the title of the organization implies, its function is to help members look over the horizon in connection with their legislative duties, or, as another member, Rep. Berkley W. Bedell (D-Iowa), stated in the *Congressional Record* of August 26, "To assist

Members as they become aware of the ways in which the future is affected by today's decisions."

More so than many of these unofficial Congressional aggregations, the Clearinghouse has a tangible presence. Rose has temporarily provided funds for a staff person to build up and manage a mailing list and produce a monthly newsletter, "What's Next?", and occasional seminars are held for Members and staff.

For copies of the newsletter and additional information, contact: Anne W. Cheatham, coordinator, Congressional Clearinghouse on the Future, 722 House Annex No. 1, Washington, DC 20515. Tel. (202) 225-3153.

CANCER (Continued From Page 2)

project and often refers to the anatomic site as the 'brest.' "

The screening program continued — and the doubters increased, both in and out of NCI, but with no effect. On December 16, 1974, Malcolm C. Pike, professor of community medicine and pediatrics at the University of Southern California School of Medicine, wrote to William Pomerance, chief of the diagnostic branch, NCI Division of Cancer Biology and Diagnosis.

Pike noted that he and his colleagues had made inquiries concerning the wisdom of breast x-rays for women under 50, and stated:

We are all in agreement that giving a women under age 50 a mammogram on a routine basis is close to unethical. This has put me in a very difficult position as I am a member of the Ethics Committee of the Cancer Center. . . I would like to suggest . . . that women under 50 only get thermograms and physicals on a routine basis with mammograms given those who have suspicious thermograms or physicals.

Pomerance replied with the following on December 27:

As to your letter . . . I could not be in any greater sympathy

with you than I am. Only two weeks ago at a meeting of some contractors in breast cancer management, I made the statement that if I had to redesign the Breast Cancer Demonstration Projects, I would make only two changes: change the initial age to age 45 and announce that thermography was being introduced into the protocol experimentally. They all 'fell on me' for the first statement and even went so far as to decide in their protocol they would start with age 30. I know that at this moment their reaction is hysteria, but there you have it. I will do what I can to see that it does not happen, but it does give you an idea as to the tenor of the medical profession. . .

I know that this [the age-45 proposal] is a far cry from not screening with mammography all below age 50, but at least it's a beginning towards reducing the radiation hazard.

The issue, however, was not forced to its eventual conclusion until Bailar, who is now editor of the *NCI Journal*, published a critique of mammography of women under age 50 and went on a one-man speaking campaign to spread doubts about the program.

After much public agonizing, which included a grand-standing poll that Rauscher took of women employees at the Cancer Institute, NCI and ACS on August 23 issued "interim guidelines" terminating the routine use of mammography for women under 50 enrolled in the screening program.

—DSG

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Fakery in Research—Invitation to an Inquiry

Cheating in science — i.e., deliberate misrepresentation of research results — is a subject about which much is whispered but little is known.

The subject, however, merits investigation, not only because it is of natural interest, but also because the general public has a big stake in the honest performance of the scientific community. Few public issues today are without scientific components, and the lay public is heavily dependent upon scientists for information that is crucial for resolving many of those issues. Therefore, it would be desirable to know whether cheating is commonplace or rare.

Fortunately, an inquiry into this matter has been organized by the British journal *New Scientist*, an international weekly with a circulation of 65,000. SGR has been given permission to ride piggyback on that inquiry, so as to determine what its readers might contribute to an assessment.

Using a questionnaire devised by Ian St. James-Roberts, a sociologist at the University of London, *New Scientist* of September 2 has asked its readers to report their views on "intentional bias," which St.

James-Roberts defines as "the purposeful manipulation of an experimental design or results to confirm a hypothesis."

In an introduction to the questionnaire, St. James-Roberts observes that "Intentional bias covers a wide range of misdemeanors, from omission of 'unrepresentative' observations to juggling with decimal points." And he concludes:

"Science has maintained an ostrich-like attitude about intentional bias for too long. At a time when scientific findings are increasingly being applied to society at large, the scientific community has an obligation to maintain high standards. Open debate and investigation are needed. . ."

SGR readers are invited to fill out and return the accompanying questionnaire. A report on our findings and those of *New Scientist* will be published shortly.



Defense, ERDA Assailed on Arms Impact Reports

The Department of Defense and the Energy Research and Development Administration are making a mockery of a new law which requires the Administration to prepare arms control impact statements for proposed weapons systems and to submit them to Congress along with the President's budget request.

Last month, long after Congress had completed its work on the Pentagon's FY 1977 budget, the two agencies belatedly produced the first batch of statements. Even if they had been submitted on time, however, the statements would have been useless since they fail to provide any meaningful analysis of arms control issues.

The new law, an amendment passed last November to the Arms Control and Disarmament Act, was intended to be a small counterweight to the arguments put out by the Pentagon each year in support of new weapons. The amendment requires the preparation of "a complete statement analyzing the impact of [a new weapons] program on arms control and disarmament policy and negotiations," and its submission to Congress in time to influence debate on the programs.

The statements submitted last month, covering 11 DoD projects and 5 ERDA programs, are nearly all less than a page in length. All consist chiefly of a factual description of the proposed weapon, and the arms con-

trol implications are dismissed in a few bland sentences. Moreover, when first submitted, the statements were classified, which makes it a bit difficult for them to influence public debate.

The Administration has, however, now declassified some of them. Their facile treatment of arms control matters is evident from the following examples.

A statement on the cruise missile program merely notes that "Cruise missiles as a class are not limited by the SALT ONE Interim Agreement; they are, however, under active consideration in the SALT TWO negotiations. The [cruise missile] development program requested in the current budget will proceed with full cognizance of any agreement reached in SALT TWO." No discussion of the fact that cruise missiles would greatly add to the number of missiles carried on US warships. No mention of the fact that an agreement limiting the number of cruise missiles would be difficult to verify and therefore difficult to negotiate. No indication of the costs of such weapons compared with alternative strategic systems. In short, no discussion of the key issues at all.

Similar treatment is given to the arms control implications of MARVs — maneuverable reentry vehicles — development of which would constitute a major step-up

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QUESTIONNAIRE

Cheating in science

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1. In your opinion, does intentional bias warrant investigation?

- ☐ Yes
☐ No

2. Is your knowledge of intentional bias based principally on

- ☐ direct personal contact with intentional bias
☐ information obtained from a colleague with such contact
☐ the scientific grapevine
☐ the media (including written material)
☐ this article
☐ other (please specify) _____

3. Do you know of or suspect intentional bias?

- ☐ No
☐ Yes—one incident
☐ Yes—more than one incident

If yes, please answer questions 4–9 (If you know of more than one incident, please answer about the one for which you have the most personal knowledge)

4. Was the intentional bias

- ☐ suspected
☐ demonstrated unequivocally

5. How was the intentional bias detected?

- ☐ individual(s) caught in the act
☐ individual(s) confessed
☐ because suspicious data obtained
☐ because of replication difficulties
☐ other (please specify) _____

6. Nature of malpractice

area of research (eg physics) _____

nature of intentional bias (eg experiment rigging, altering data) _____

where did it take place (eg in university laboratory, industrial laboratory, in the field) _____

how often did it occur

- ☐ once
☐ 1–5 times
☐ more than 5 times

7. How many people were involved?

- ☐ one
☐ more than one (please specify) _____

8. Nature of suspect(s)

age (approximate) _____
sex _____
status (eg student, research assistant) _____

9. What happened to suspect(s)?

- ☐ dismissed
☐ nothing
☐ don't know
☐ other (please specify) _____

10. What is your own field of research? _____

11. What is your own status? _____

12. Please ring the appropriate category for your age and sex

under 20	20–29	30–39
40–49	50–59	over 60
male	female	

Please feel free to supply additional information here if you wish to do so:

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Kennedy Seeks to Extend Genetic Research Regulations

The debate over the potential risks and benefits associated with recombinant DNA experiments reached Capitol Hill last week, courtesy of a half-day hearing held by Senator Kennedy's health subcommittee. Though the hearing was simply an exchange of views rather than a prelude to legislation, it may well prove to be important in securing industry's compliance with safety guidelines recently published by NIH (SGR Vol. VI, No. 12). It may also prompt action by the Administration to extend the NIH guidelines to all government agencies.

Kennedy, who said last year that he believes regulation of recombinant DNA research is too important a matter to be left solely to scientists, noted that the NIH guidelines are "generally considered to be an important step in the reduction of risk in this area." But he added that "the problem is that many groups doing research do not fall under these guidelines."

The guidelines apply only to research supported by NIH, but Kennedy stated that unless industry agrees to comply with them on a voluntary basis, "I will have to consider legislative action." Kennedy went on to note that his concerns about "the potential for industrial abuse" were increased by the fact that officials of the General Electric Company — which has been supporting some research designed to create a bacterium capable of breaking down oil slicks more efficiently — refused to testify at the hearing.

The Pharmaceutical Manufacturers' Association is now examining the NIH guidelines, and has agreed to inform NIH Director Donald S. Fredrickson by November whether or not they are acceptable to the drug industry. Joseph Stetler, chairman of the PMA,

told the subcommittee last week that six drug companies are already involved with recombinant DNA research, and one other company is gearing up to begin experiments.

Even if the industry does agree to abide by the guidelines, however, there is no mechanism at present for federal monitoring to ensure that their promise is kept.

As for recombinant DNA experiments supported by federal agencies other than NIH, Fredrickson said last week that the National Science Foundation and the Energy Research and Development Administration have both agreed to extend the NIH guidelines to research they support. The Department of Defense informed Fredrickson that it is not conducting any recombinant DNA experiments, but if it ever does, it will abide by the guidelines. That leaves the Department of Agriculture, which had not made any statement on the matter by last week.

It should be noted that the compliance of all government agencies could be secured immediately with a stroke of President Ford's pen. All that would be required is the promulgation of an executive order telling every agency to adopt the guidelines. In fact, Kennedy and Sen. Jacob Javits (R-NY) suggested such a move to Ford in a letter last July, but so far they have received no response.

The publicity given to the hearings, and Kennedy's direct threat to legislate next year if the industry does not agree voluntarily to adopt the guidelines, are likely to provide a strong stimulus to an extension of the guidelines to groups which are not now covered. It is also worth pointing out that Kennedy offered no direct challenge to the substance of the guidelines.

ARMS CONTROL (Continued From Page 4)

in strategic capability. The relevant statement blandly notes: "All MARV efforts involve only advanced development or technology programs. No decisions have been made on full-scale development or production for any MARV. MARV's are not restricted by existing agreements or by a SALT TWO treaty based on the Vladivostok understanding. Any MARV's on strategic missiles would be counted under the 2400 aggregate limit and the 1320 MIRV limit if associated with MIRV systems."

The statements are so inadequate that they are already causing loud rumblings on Capitol Hill. Rep. John Seiberling (D-Ohio), noted last week, for example,

that they "are clearly an insult to our intelligence and do not begin to assess the arms control implications of our major weapons systems."

The normally quiescent Sen. John Sparkman (D-Ala.), chairman of the Senate Foreign Relations Committee, and the ranking Republican committee member, Sen. Clifford Case (R-NJ), were even moved to write a letter to Secretary of Defense Donald Rumsfeld and ERDA Administrator Robert Seamans, suggesting that in future they should obey the laws of the land. The letter spelled out in detail the kind of information to be included in arms control impact statements, and noted that their publication should coincide with the submission of relevant budget requests. "In future," the Senators wrote, "the timing must be in full compliance with the law."

Electric Car Veto Spotlights Federal R&D Policy Issue

President Ford's surprising veto of a modest bill to spur development of electric vehicles, which was unsurprisingly overridden by Congress last week, may have been consistent with his carefully cultivated electoral image as a fiscal conservative, but it nevertheless conflicts sharply with some of his Administration's own, oft-proclaimed energy goals.

Puzzling though the veto may be, the matter does bring up a vexing question which is going to become more prominent as various energy programs run their course, namely: how far should the Federal government get involved in the commercial application of technologies which it has helped to develop?

The bill, HR 8800, which was written by Rep. Mike McCormack (D-Wash.), is based on the reasoning that an electric car industry is unlikely to spring up without some hard cash and other support from the federal government. McCormack, a shrewd, second-term Congressman who has engineered himself into a pivotal position in energy matters, argues that the technology of electric transportation is already so far advanced that a bit of government help is required to get it to the marketplace.

The bill, accordingly, seeks to do two things. First, it authorizes funds for an expanded R&D program within the Energy Research and Development Administration (ERDA), aimed at the development of longer lasting, more reliable batteries capable of powering vehicles for 50 miles or so without recharging. Second — and this is the part which Ford found objectionable — it sets up a program through which the federal government would subsidize the production and testing of up to 7500 electric cars over the next six years.

The demonstration effort will be in two parts. Within three years, the government is required to purchase up to 2500 vehicles incorporating existing technology. The idea is to see how they work in everyday use. Then, four years after passage of the bill, the government is required to purchase up to 5000 more vehicles, powered by advanced batteries which should, by then, have been

produced. In addition to obtaining some operating experience with electric cars, the bill is also designed to support the growth of an electric vehicle manufacturing industry.

Ford took issue, however, with most of those ideas. The guts of his veto message was incorporated into the final sentence: "I am not prepared to commit the Federal government to this type of a massive spending program which I believe private industry is best able to undertake."

The "massive spending" in the bill amounts to only \$160 million spread over six years, however, which is relatively modest in comparison with the billions of dollars which will be poured into other technologies. Moreover, it is only an upper limit, and the actual cash will have to be appropriated each year by the appropriations committees.

More importantly, Ford took exception to the idea that the federal government should get involved in supporting commercial production of electric vehicles. "Such development," he argued, would cover some of the areas which private industry stands ready to pursue." But the plain fact is that the nascent electric car industry is made up mostly of small firms which have insufficient capital to embark on large-scale manufacture without some government support.

Ford's reluctance to see the federal government get involved with commercial application of energy technology should also be seen in the light of the \$100-billion Energy Independence Authority (EIA) which the Administration proposed last year. Designed to provide loans, loan guarantees and other financial support for commercial development of new sources of energy (such as coal gasification and the production of oil from shale), the EIA would result in massive federal intervention in the marketplace. Though plans to establish the EIA have quietly been dropped, the idea behind it has already been incorporated into legislation, backed by the Administration, to provide loan guarantees to the synthetic fuels industry. By comparison, the electric vehicles legislation represents a very minor intrusion into the hallowed marketplace.

As for the potential impact of the bill on energy conservation, estimates vary. But the EPA and the Federal Energy Administration have projected that between 10 and 20 million electric vehicles could be on the streets by the year 2000, which would represent a saving of between two and four million barrels of oil per day. Achieving that goal should therefore be consistent with the Ford Administration's loudly proclaimed, but virtually non-existent, policy of encouraging energy conservation.

—CN

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Primaries, Retirements Hit Science Committee

Retirements and primary election bids for other offices have thinned the ranks of members of Congress who have been involved with research and development. Hardest hit is the House Science and Technology Committee, which, with election day likely to take a further toll, has definitely lost seven of its 37 members, including some of the most senior and active.

James W. Symington (D-Mo.), chairman of the committee's Subcommittee on Science, Research, and Technology, gave up a sure chance for re-election to the House when he unsuccessfully ran for the nomination for the Senate seat being vacated by his father. Symington was particularly active in behalf of the National Science Foundation when it was assailed during the past year by various rightwing cranks. He was also a member of the Interstate and Foreign Commerce Subcommittee on Health and the Environment.

Though friends of NSF will mourn Symington's departure, there is a bit of solace in the outcome of another senatorial run by a member of the Science and Technology Committee. John B. Conlan (R-Ariz.), one of the most diligent snipers at NSF, dropped out of the House for an unsuccessful bid for the nomination for the seat held by Paul J. Fannin. The outcome is a double blessing for NSF, since Conlan had evolved into a mighty nuisance for NSF, and, if elected to the Senate would almost certainly have been even more troublesome.

Another Republican, Alphonzo Bell, of Cali-

fornia, also made the casualty list because of senatorial aspirations. Bell is the second-ranking Republican on the Science and Technology Committee.

Also slated for departure on the minority side is Marvin L. Esch, who gave up his House seat for what turned out to be a successful run for the Republican senatorial nomination in Michigan.

For another Democrat, Ken Hechler, of West Virginia, the outcome remains uncertain. Hechler made an unsuccessful run for the gubernatorial nomination, and, therefore, did not run in the primary for his House seat. However, he is now trying to retain his seat by running in his old district as an independent.

And three members of Science and Technology are leaving via the retirement route. They are Charles Mosher, of Ohio, the ranking Republican on the Committee; Thomas N. Downing (D-Va.), and John Jarman (R-Okla.).

Election returns will almost certainly produce other changes. One of the leading vulnerables is said to be Chairman Olin Teague (D-Texas), who faces a difficult re-election fight.

The changes in membership are viewed with considerable regret by NSF officials. The Science and Technology Committee has developed into a strong supporter of the Foundation, with Symington and Mosher particularly ready to help out in difficult moments. One Administration science official told SGR, "Now we have to educate a new bunch."

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